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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/591,866

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EXAMINER

THOMPSON, JASON N

ART UNIT

PAPER NUMBER

4166

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/591,866	Applicant(s) CROWLEY, DAVID MICHAEL	
	Examiner JASON THOMPSON	Art Unit 4166	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-21 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 12-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>02/08/2008, 10/05/2007, and 09/06/2006</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 12, 13, 14, 15, and 16 are rejected under 35 U.S.C. 102(b) as being unpatentable over U.S. Patent No. 6, 151, 901 (Dobak).

3. (Claim 12) Column 6, lines 22-29, 37-40, and 48-49 of U.S. Patent 6, 151, 901 (Dobak) teach a dual-lumen, coaxial hose consisting of an inner and outer tube. The inner tube supplies high pressure gas from the compressor to the medical device and the outer tube returns low pressure gas to the compressor from the medical device. Additionally, it teaches that the compressor may be any suitable single-stage or oil-based compressor that may include an after cooler.

4. (Claim 13) Column 8, lines 37-46 and figure 6 of U.S. Patent 6, 151, 901 (Dobak) teach the use of spacer supports for use within the dual lumen hose. Depicted in figure

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6, the inner tube passed through the inner opening (72) and the outer tube encompass the outer ring (45). The spacers support the inner tube within the center of the outer tube.

5. (Claim 14) Column 8, lines 22-36, and column 9, lines 15-17 of U.S. Patent 6, 151, 901 (Dobak) teach that high pressure cryogenic gas follows a tortuous or labyrinthian path through the heat exchangers within the inner tube. This feature aids in efficient heat transfer to achieve the desired cryogenic temperature.

6. (Claims 15 and 16) Column 6, lines 53-57 of U.S. Patent 6, 151, 901 (Dobak) teach a flexible inner and outer cryogenic tubes formed from wire braided polymer.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6, 151, 901 (Dobak), and further in view of U.S. Patent No. 4, 796, 433 (Bartlett).

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9. (Claim 17) Column 6, lines 23-27 of U.S. Patent 6, 151, 901 (Dobak) teach the dual-lumen hose design for cryogenic applications but it does not disclose the tube material as stainless steel.

10. Column 5, lines 57-60 of U.S. Patent 4,796,433 (Bartlett) teach a cryogenic system where the supply and return tubes are composed of stainless steel. As a result, it would have been obvious to one with ordinary skill in the art to consider using stainless steel for cryogenic tube construction.

11. (Claim 21) Column 6, lines 23-29 and 37-40 of U.S. Patent 6, 151, 901 (Dobak) teach a dual-lumen, coaxial hose consisting of an inner and outer tube. The purpose of this arrangement is to reduce the overall energy requirements of the system and permit colder operating temperatures by allowing the low pressure (high velocity) gas returning to the compressor to pre-cool high pressure gas leaving the compressor to the surgical device. However the surgical device in the reference is not a MRI cryostat.

12. Column 4, lines 9-14 of U.S. Patent 4,796,433 (Bartlett) teach a cryogenic recondenser system consisting of a condenser, refrigerator, and single-lumen cryogenic lines for the purpose of cooling the magnets of MRI cryostats. As with (Dobak), (Bartlett) teaches that high pressure gas is supplied by the compressor to a piece of equipment, while low pressure gas is returned to the compressor from the equipment. As a result, it would have been obvious to one with ordinary skill in the art to consider a dual-lumen cryogenic hose as taught by (Dobak), in conjunction with the MRI cryostat components of (Bartlett) to reduce work requirements from the compressor.

13. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,151,901 (Dobak), and further in view of U.S. Patent 5,697,220 (Pierce).

14. (Claim 18) Column 6, lines 22-29 of U.S. Patent 6, 151, 901 (Dobak) teach a refrigeration system for cryosurgical applications that consists of a compressor – that may include an after cooler - as well as a dual-lumen cryogenic fluid transfer hose. However, the reference does not teach that the transfer hose is used to link the compressor and after cooler.

15. Column 2, lines 23-26 and figure 1 of U.S. Patent 5,697,220 (Pierce) teach a cryogenic refrigeration system for cooling superconducting magnets that consists of a compressor, a refrigerator, and cryogenic fluid transfer tubes that link the two components. As a result, it would have been obvious to one with ordinary skill in the art of cryogenic fluids to utilize a dual-lumen cryogenic hose as taught by (Dobak), in conjunction with the cryogenic assembly of (Pierce) to connect the compressor to the refrigerator in order to reduce work requirements from the compressor.

16. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6, 151, 901 (Dobak), in further view of U.S. Patent 5,697,220 (Pierce) and U.S. Patent No. 6,321,743 (Khinkis).

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17. (Claim 19) Column 6, lines 37-40 of U.S. Patent 6, 151, 901 (Dobak) teach that high pressure cryogenic gas is supplied from the compressor via the inner tube and that low pressure cryogenic gas returns to the compressor via the outer tube. The reference does not teach that this flow arrangement can be reversed. Additionally, U.S. Patent 5,697,220 (Pierce) teaches a cryogenic refrigeration system for superconducting magnets, but the reference only discusses single-lumen cryogenic tubes.

18. The dual-lumen cryogenic gas transfer hose in the present application as well as in (Dobak) are essentially recuperators. Column 4, lines 19-27 of U.S. Patent 6, 151, 901 (Dobak) teach a recuperator design whereby the low pressure return gas is used to pre-cool the high pressure supply gas. Similarly, column 4, lines 3-14 of U.S. Patent 6,321,743 (Khinkis) teach a recuperating radiant tube system where exhaust gases preheat inlet air.

19. Specifically, column 4, lines 36-41, 49-54, and figure 1 of U.S. Patent 6,321,743 (Khinkis) teach that combustion of an air-fuel mixture occurs within an outer tube. Heat generated from this process is transferred through an outer tube to perform work. Waste heat and combustion byproducts then pass through the inner tube where the inlet air stream is pre-heated by the exhaust gases, improving thermal efficiency.

20. The use of waste heat to pre-heat inlet air as taught by (Khinkis) is analogous to the use of low pressure cryogenic gas to pre-cool high pressure cryogenic gas, as taught by (Dobak). As a result, it would have been obvious to one with ordinary skill in the art of recuperators to consider alternate fluid flow configurations in the device of (Dobak) as taught by (Khinkis).

21. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6, 151, 901 (Dobak) in further view of U.S. Patent 5,697,220 (Pierce) and further in view of U.S. Patent No. 4,796,433 (Bartlett).

22. (Claim 20) Column 6, lines 22-29 of U.S. Patent 6, 151, 901 (Dobak) teach the components of a cryogenic assembly as a compressor that may have an aftercooler as well as a dual lumen cryogenic tube. However the reference does not discuss the use of such a system with a MRI cryostat. Additionally, column 2, lines 23-26 and figure 1 of U.S. Patent 5,697,220 (Pierce) teach a cryogenic refrigeration system for superconducting magnets that consists of a compressor, a refrigerator, and single-lumen cryogenic fluid transfer tubes that link the two components. However the reference does not specify the cryostat as a MRI cryostat.

23. Column 4, lines 9-14 and 38-48 of U.S. Patent 4,796,433 (Bartlett) teach a cryogenic recondenser system consisting of two compressors, a refrigerator, and single-lumen cryogenic fluid transfer tubes for cooling a MRI cryostat.

24. As with (Dobak) and (Pierce), (Bartlett) teaches that high pressure gas is supplied by the compressor to a piece of equipment, while low pressure gas is returned to the compressor from the equipment. As a result, it would have been obvious to one with ordinary skill in the art to consider a dual-lumen cryogenic hose as taught by (Dobak) in conjunction with the basic cryogenic assembly taught by (Pierce) in addition

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to the specific use of said components with a MRI cryostat as taught by (Bartlett), in order to reduce work requirements from the compressor.

Conclusion

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

U.S. Patent 3,988,029

U.S. Patent 5,697,220

U.S. Patent 5,452,582

U.S. Patent 4,310,303

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON THOMPSON whose telephone number is (571)270-1852. The examiner can normally be reached on monday-thursday.

27. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on (571)272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

28. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JNT

12/22/2010

/BRIAN CASLER/
Supervisory Patent Examiner, Art Unit 3737